



# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### Improvements in or relating to Telescopic Tubes

I, KARL SEIFERT, of 13, Gartenstrasse, Lüdenscheid, Westphalia, Germany, a German citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

This invention relates to telescopic tubes, more particularly for photographic and the like tripod stands, but also applicable for other purposes, for example for display appliances such as hat stands and the like, and for vehicle aerials. The invention is concerned with telescopic tubes of the type in which the inner ends of the telescoping tube sections are provided with enlarged sleeves which abut against constrictions on the surrounding tube sections when the tube is extended.

In order to keep its collapsed length as small as possible for a given extended length, the telescopic tube must be made up from a plurality of sections. The diameter of the outermost section increases with the number of collapsible sections, so that the tripod stand or the like becomes bulkier the smaller is its collapsed length. Moreover, in order to keep the thickness as small as possible, on the one hand, tubes of small wall-thickness, for example, 0.35 mm. are used, and on the other hand, there is only a slight difference in the diameters of the enlarged sleeves and of the constrictions, as compared with those of the appropriate tube sections, so that the shoulders which limit the extension of the tube are very shallow, being for example, only 0.2 mm. in depth. In these circumstances, through the employment of unnecessarily great force in extending the tube, it may happen that the enlarged end of one or other of the thin-walled tube sections gives way internally under the applied pressure, so that the sleeve constricts somewhat and slides through the constricted end portion of the surrounding tube section and the collapsible tube is pulled apart.

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A further disadvantage resides in the fact that in forcibly closing the tube the thin-walled inner ends of the telescoping tube sections are compressed together by the stop-cams, slide over them and impinge against the detent-pins which are located in the enlarged sleeves to lock the tube sections to one another, ejecting said pins from the apertures in the sleeve walls in which they are carried. In consequence of this not merely is the locking device rendered inoperative at one place, but the pins now adrift in the interior of the tube sections cause trouble and can in the case of multi-unit tripod stands, render an entire leg useless.

The invention aims at obviating the foregoing disadvantages and at providing a telescopic tube of the aforementioned type in which trouble or damage cannot occur even with clumsy handling. To this end, according to the invention the walls of the enlarged sleeves provided at the inner ends of the telescoping tube sections are supported internally by transverse walls or partitions arranged therein.

In the first place with the construction of the invention it can no longer happen that on impinging against the constrictions in the surrounding sections the enlarged ends of the tube sections yield inwardly and slip through said constrictions. They are, on the contrary, stiffened by the partitions and kept in shape, so that the extent to which the tube can be pulled out is limited positively by the shoulders formed by the sleeves and constrictions and it is impossible to pull the telescopic tube apart. The walls of the enlarged sleeves are most effectively supported by locating the partitions near the shoulders formed by the enlargements, so that the support acts directly at the impact points of the sleeves. In some cases the partitions may also be located at other points of the enlarged sleeves, for example near the edge or rim of the sleeve. It is also possible to arrange two partitions in each

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sleeve, one at the shoulder and the other at the rim.

A further consequence of the new arrangement is that the interior of the telescopic tube is subdivided into a number of chambers corresponding to the number of tube sections and separated from one another by the partitions. This affords the advantage that any detent pin dislodged or knocked out of its guide holes can only move about in the interior of a single tube section, that is, in a space closed at both ends by partitions, which contains no pins other than that which has come adrift. If each sleeve contains two partitions, then the mobility of each pair of pins is even limited to the cavity of the appropriate sleeve, or it may even happen that the two partitions preclude the knocking out of the pin at all. In any event any pins dislodged are kept away from the other detent pins of the telescopic tube, so that any blocking or obstruction of the tube or of the leg of a tripod stand by dislodged pins is prevented. It may even happen that there is no locking means at one point. However, the telescopic tube is still usable, either by leaving in the collapsed position during use the two sections which cannot be locked to one another, or by locking them by inserting a pin externally. Moreover it is possible, when the partitions are located near the shoulders formed by the enlarged sleeves, to utilise said partitions for the purpose of limiting the closing movement, in that on collapsing the tube the inner end of each tube section strikes against the partition of the surrounding section. With this method of limiting the closing movement the ends of the tubes can no longer impinge against the detent pins located in the enlarged sleeves, whereby the risk of knocking these pins out of their guides, is avoided.

The partitions may consist of discs or annuli, preferably of sheet metal, immovably secured in the sleeves. An advantageous construction consists in forming the partitions from the bottoms of cups inserted in the sleeves, and which likewise are preferably made of sheet metal. Further possible methods of carrying out the invention and advantages are set out in the following description.

Several embodiments of the invention are illustrated diagrammatically and by way of example in the accompanying drawing, wherein for the sake of simplicity only the contiguous ends of two sections of a telescopic tube are shown in the extended position.

In the drawings:—

Fig. 1 (the first Example) is an axial section on the line A-A of Fig. 2,

Fig. 2 is an axial section on the line B-B

of Fig. 1,

Fig. 3 is a cross section on the line C-C of Fig. 1,

Figs. 4 to 6 are respectively an axial section of a second, third and fourth embodiment.

1 and 2 are two tubular sections of a telescopic tube, for example a leg of a tripod stand, said tube consisting of a given number of telescopically collapsible sections. The inner ends 3 of the tube sections are in the form of enlarged sleeves, in known manner, while the outer ends 4, on the other hand, are constricted. The sections are in this way slidably guided one within the other with a snug fit, whilst at the same time shoulders 5 are formed, which impinge against one another on pulling out the tube and thus limit the degree of extension. The sleeve-shaped ends 3 are provided with hollow pins 6 serving for the mutual locking in position of the tube sections, said pins being guided in closely fitting apertures 7 in the sleeve walls and being constrained outwardly by a spring 8. When the tube is extended the outer ends of the pins engage with holes in the surrounding tube, thereby securing the tube sections to one another.

In the case of the embodiments according to Figs. 1 to 3, a cup 9, 10 pressed or drawn from sheet metal is inserted as a close fit in each enlarged sleeve 3, and in such a manner that the bottom 9 thereof is adjacent to the shoulder formed by the sleeve. The wall 10 of the cup, which terminates at the level of the rim of the sleeve 3, is provided with apertures corresponding to the apertures 7 in the sleeve wall for the passage of the detent pins 6. The cup 9, 10 is suitably secured in the enlarged end of the tube 3, for example, with one or two small rivets which are driven into holes in the walls of the cup and sleeve. Its bottom 9 forms a partition adjacent to the shoulder 5 and at right angles to the tube axis, which supports the walling of the sleeve 3 internally and stiffens it to such an extent that it is not liable to bend inwards. At the same time the bottom 9 forms an abutment, against which the sleeved end 3 of the adjacent inner tube section impinges when the telescopic tube is closed up. The inner ends of the tubes therefore no longer strike against the detent pins 6, whereby the latter are protected against dislodgment from their guides. Moreover the bottom of the cup 9, 10 subdivides the interior of the telescopic tube into a plurality of chambers, each of which only contains one detent pin 6. Any pins dislodged can only move about in a space defined by the bottoms of two adjacent cups and cannot gain access to other parts of the telescopic tube. Furthermore, the walling of the cup 9, 10 also strengthens and stiffens

the rim of the enlarged sleeve 3, so that it cannot be buckled when it strikes against the bottom of the cup inserted in the adjacent outer tube. Finally, the wall 10 of the cup 5 also forms an extension and therewith an improvement of the guide way for the detent pins 6.

In order that no reduced or excess pressure may be produced in the interior when 10 extending or collapsing the telescopic tube, which would exert an unnecessary braking effect, the bottoms 9 of the cups 10 inserted in the enlarged portions 3 of the tube sections may be provided with air passages 15 11. Said passages 11 can be more or less wide. It will be sufficient if the bottom of the cup or the partition 9 formed therefrom is left in the form of an annulus. Instead of being formed by apertures in the bottoms of 20 the cups, air passages can also be formed by pressing longitudinal channels in the outside of the walls 10 of the sheet metal cups. If, as is assumed in the Example, the sections of the telescopic tube are made with pressed 25 longitudinal ridges and channels 12 for the purpose of ensuring non-rotational sliding,—in which case the walls 10 of the cup 9, 10 must be provided with channels at the same place—the air passages may be provided by 30 making the channels 13 in the walls of the cups deeper than is necessary for engaging with the ridges provided on the inside walls of the sleeves, so that in this case slit-shaped channels are formed, as can be seen from 13 35 in Fig. 3.

The cups 9, 10 can be fixed in the sleeves 3 by means other than riveting, as is assumed in the Example. For example, the rim of the sleeve, projecting beyond the edge of the 40 cup, may be flanged inwardly thereover. In this case, if desired, a disc or annulus may be inserted between the flanged edge and the edge of the cup 9, 10, which constitutes a second partition located at the edge of the 45 sleeve. It is also possible to secure the cup in the sleeve by knurling the walls of both parts simultaneously. In some cases a special fixing may be dispensed with and each cup can be kept in position in the 50 appropriate sleeve by the detent pins 6, which couple the cups 9, 10 with the sleeves 3 by virtue of the fact that their ends engage simultaneously in the holes in the walls of both parts. The example can 55 also if desired, be modified by inserting the cup 9, 10 in the inverted position, so that the partition formed by its base 9 is adjacent the edge of the sleeve.

In the embodiment according to Fig. 4, 60 each enlarged sleeve 3 contains two sheet metal cups 9, 10 and 14, 15, which are inserted into one another with facing open ends. The bottoms 9 and 14 of the two cups form two partitions at right angles to the

tube axis, of which one is located near the 65 shoulder 5, the other on the contrary, being adjacent the rim of the sleeve. As will be apparent, this construction furnishes a very effective support and stiffening for the enlarged tubular sleeve 3. The advantage 70 is also afforded that the two interengaging cups 9, 10 and 14, 15 constitute a casing surrounding the detent pins 6, which prevents the pins and their springs from being knocked out of their guides, so that any 75 chance of failure is removed.

The same result as in the case of the embodiment of Fig. 4 can be achieved according to Fig. 5 by bending the rim of the cup 9, 10 inwards in the form of a flange. 80 The annular flange 16 then forms an auxiliary partition, whilst it also protects the detent pins from being knocked out of their guides. The sheet metal cups can be secured in the embodiments according to Figs. 4 and 5 in 85 the same way as is described above with reference to the first Example. A construction similar to that of Fig. 5 can also be achieved in the embodiments according to Figs. 1–3 by bending inwardly the walls of 90 the tubular sleeve 3 in the form of a radial flange overhanging the rim of the cup.

In the embodiment according to Fig. 6, the partitions serving to support and stiffen the enlarged sleeves 3 consist of simple sheet 95 metal discs, which may also be provided with air passages 11, or may be in the form of annuli. In this case, two such discs 17 and 18 are provided in each sleeve; one (17) 100 adjacent the shoulder 5 and the other (18) 100 near the rim of the sleeve. The first disc is secured to between the inner shoulder surface of the enlarged sleeve 3 and a bead or the like 19 externally pressed into the wall of said sleeve; the second disc on the 105 other hand is secured between a similar bead or the like 20 and the inwardly flanged edge 21 of the sleeve; the effect is the same as in the Examples of Figs. 4 and 5.

The embodiment according to Fig. 6 may 110 be modified by omitting the beads 19, 20 and inserting between the two metal discs 17, 18 a ring serving as a spacing member, which ring may consist of a short section of tube or may be bent from a metal strip. A further modifi- 115 cation of the Example may consist in only providing the partition adjacent the shoulder 5, the other being omitted. The remaining partition 17 may, as before, be secured between the inner shoulder surface of the 120 tubular sleeve and a bead 19 pressed into the latter, or by means of a ring inserted into the sleeve behind the partition. In such case, this ring may be secured in the same way as the metal cup illustrated in Figs. 1 to 3. 125 Conversely, one partition only may also be provided at the rim of the sleeve. The partition can as in the case of the partition

18 illustrated in Fig. 6 be retained in position by means of the bead 20 and the flange 21 or also solely by flanging the rim of the sleeve, if a spacing ring is inserted between the partition and the inner shoulder surface of the sleeve. It will be understood that any spacing rings used are to be provided with holes for the passage of the detent pins 6.

Various further modifications of the Examples depicted and other modifications and applications are possible within the scope of the invention. Thus, the air passages could also be formed from peripheral notches in the partitions instead of holes. In such case the peripheral notches could, if desired, be of such shape that the partition was in the form of a spider or of a similar shape. An advantageous embodiment also consists in inserting a ring in each enlarged sleeve, one or both edges of which in a similar manner to the edge 16 of the cup in Fig. 5, being bent inwardly in the form of an annular flange at right angles to the axis of the tube. Although it is preferable that the partitions or the cups as well as the rings securing the partitions should be made of metal and especially sheet metal, these members could also consist of any other sufficiently robust material, for example of a plastic material of suitable strength.

Finally, the detent pins and their springs may be constructed in a different manner from that shown in the drawing, or other locking devices may be provided for the tube sections.

The expression "tube" or "tube section" employed in the foregoing description and in the appended claims is not intended simply and solely to include cylindrical tubes with continuous walls, but also tubes of any other desired cross section customary in the construction of tripod stands and the like, such as for example, tubes of oval, triangular or similar cross section and also tubes having a longitudinal gap or slit, so-called profiled tripod stands for example, of C-shaped or similar cross section.

HAVING NOW particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A telescopic tube, especially for tripod stands, of the type in which the inner ends of the telescoping tube sections are provided with enlarged sleeves, by means of which when the tube is extended they abut against constrictions on the surrounding tube sections, characterised in that the walls of the enlarged sleeves are supported internally by transverse walls or partitions arranged therein.

2. Telescopic tube according to claim 1, wherein the partitions are situated adjacent the shoulders formed by the enlarged sleeves.

3. Telescopic tube according to claim 1 or 2, wherein the partitions also serve as abutments for limiting the closing movement of the tube sections.

4. Telescopic tube according to claim 1, wherein the enlarged sleeves contain two partitions, of which one is situated adjacent the shoulder and the other near the rim of the enlarged sleeve.

5. Telescopic tube according to claim 1 or 2, wherein the partitions are each formed by the bottom of a cup member, preferably of metal, inserted into the enlarged sleeve.

6. Telescopic tube according to claim 1 and 4, wherein one of the two partitions, which are preferably made of sheet metal, is formed by the bottom of a cup inserted into the enlarged sleeve and the other by a disc or annulus adjacent the rim of the cup.

7. Telescopic tube according to claim 5, wherein when employing a cup with a bottom forming a partition, a second partition is formed by the rim of the cup bent inwards in the form of a flange.

8. Telescopic tube according to claim 5, wherein the enlarged sleeves each contain two cups inserted into one another with facing open ends.

9. Telescopic tube according to claims 1 and 4, wherein the enlarged sleeves each contain a sheet metal ring, one or both edges of which are bent inwards in the form of flanges at right angles to the tube axis.

10. Telescopic tube according to claim 2, wherein the partition located near the shoulder of the enlarged sleeve is secured by a ring inserted in said enlarged sleeve.

11. Telescopic tube according to any of claims 5, 8, 9 and 10, wherein the cup or the cups or a ring provided with internal flanges or carrying a partition at the inner shoulder surface of the enlarged sleeve are secured by rivets driven into holes in the walls of the cup and sleeve.

12. Telescopic tube according to any of claims 5, 8, 9 and 10, wherein the cup or the cups or a ring provided with internal flanges or carrying a partition are secured by knurling together both the walls of the cup or ring and that of the sleeve.

13. Telescopic tube according to claim 1 and 5 or 6, wherein the cup, if desired together with an inverted second cup, inserted or together with a second partition formed from a sheet metal disc, is secured between the inner shoulder surfaces of the enlarged sleeve and the inwardly flanged rim of the latter.

14. Telescopic tube according to any of claims 5, 8, 9 and 10, characterised in that the cup or the cups or a ring provided with internal flanges or carrying a partition, are retained by detent pins located in the enlarged sleeve and wherein said pins

engage in holes both in the walls of the cup or ring and of the sleeve.

15. Telescopic tube according to claim 1 or 4, wherein a partition located near the rim of the enlarged sleeve together with a spacing ring, or two partitions together with an intervening spacing ring, are secured between the inner shoulder surface of the enlarged sleeve and the inwardly flanged rim of the sleeve.

16. Telescopic tube according to claim 1 and 2, wherein a partition located adjacent the shoulder of the enlarged sleeve is secured between the inner shoulder surface of the enlarged sleeve and a bead or the like rolled externally into the wall of the latter.

17. Telescopic tube according to claim 1 or 4, wherein a partition located adjacent the edge of the enlarged sleeve is retained between a bead or the like rolled externally into the wall of the sleeve and the inwardly flanged rim of the sleeve.

18. Telescopic tube according to any of the preceding claims, wherein the partitions are provided with holes or peripheral notches for the passage of air or are cut out in annular, spider-shape or similar form.

19. Telescopic tube according to claim 1 and 4, wherein longitudinal channels serving as air passages are formed externally into the walls of a cup, the bottom of which forms a partition.

20. The telescopic tubes constructed, arranged and adapted to operate substantially as herein described and as illustrated with reference to the accompanying drawings.

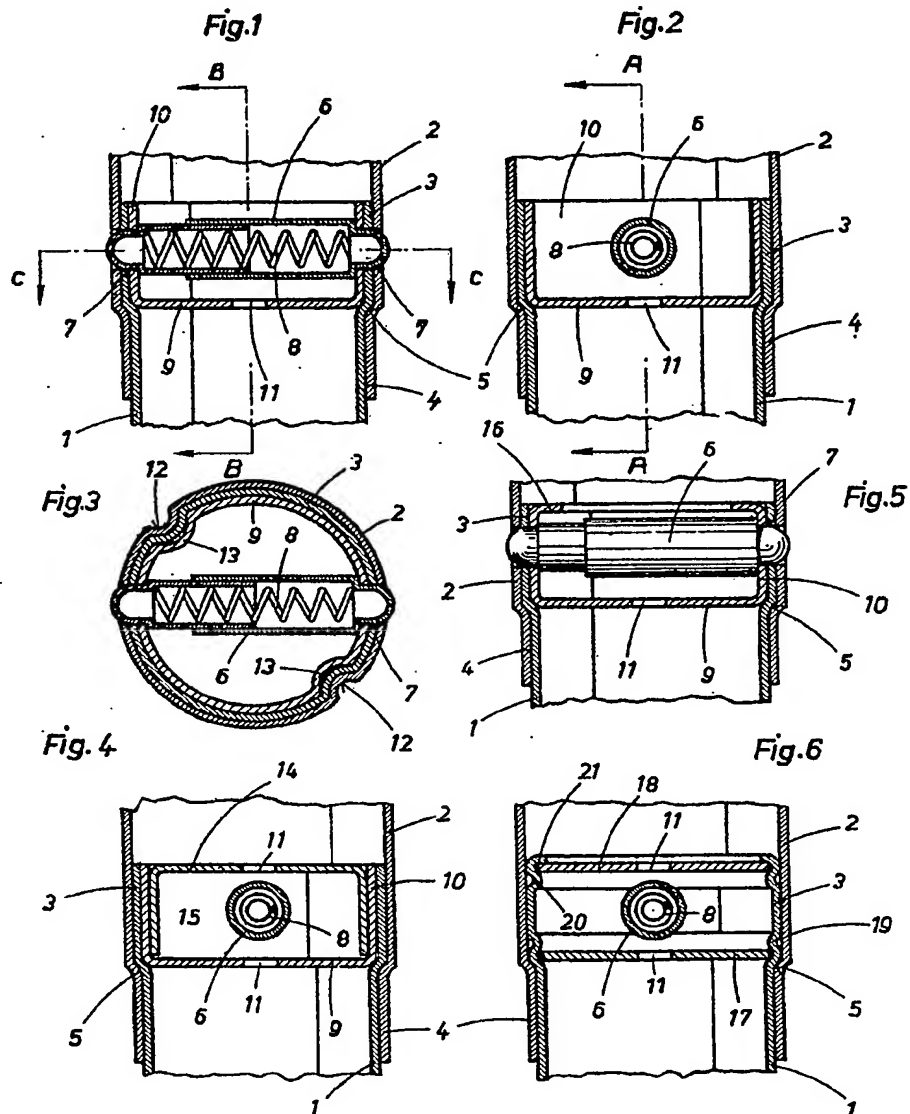
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